

REMARKS

In response to the above-identified Office Action, Applicants have amended the application and respectfully request reconsideration thereof.

Objections to the drawings:

The drawings have been objected to because they need to be centered with sufficiently large margins and also because the handwriting in the drawings is difficult to read. Accordingly, Applicants have included with this response a set of formal drawings that satisfies the drawing requirements. Applicants respectfully request the Examiner to approve these formal drawings.

The drawings have also been objected to under 37 CFR §1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "310" in Figure 3 and "22" in Figure 2. Applicants have amended the specification to replace reference "320" in the specification with reference "310" as shown in Figure 3. Reference "22" in the original Figure 2 has been changed to "220" in the formal drawings submitted with this response. This change is fully supported by the description of Figure 2 on pages 5-7 of the specification.

In addition, Figure 4 has been amended with this response to include the corresponding text labels for boxes 412A, 412B, and 412C. These changes to Figure 4 are fully supported by the description of Figure 4 on pages 7-10 of the specification.

Claims Objections:

Claims 4 and 8 have been objected to because of the informalities identified on page 3 of the Office Action. Applicants would like to thank the Examiner for pointing out the typographical errors in these claims. Accordingly, Applicants have amended claims 4 and 8 to correct these typographical errors. Withdrawal of the objection to claims 4 and 8 is therefore respectfully requested.

Claims Rejections under 35 U.S.C. §112:

Claim 8 has been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Specifically, claim 8 recites the limitation “the processor” in line 1 for which there is insufficient antecedent basis. Applicants have amended claim 8 so that claim 8 now depends from claim 7 instead of claim 3. As amended, the limitation “the processor” now has sufficient antecedent basis.

Claims Rejections under 35 U.S.C. §102

Claims 1 and 2 have been rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,445,702 to Wright (hereinafter referred to as Wright). To anticipate a claim, the prior art reference must teach every element of the claim. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference”. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicants respectfully submit that claims 1 and 2 are not anticipated or rendered obvious by Wright for the reasons and explanations set out below.

With respect to claim 1, Applicants respectfully submit that Wright does not teach, disclose, or suggest the following elements of claim 1:

“determining an *outer quality metric* in accordance with a plurality of information bits;

determining at least one *inner quality metric* in accordance with a group of information bits; and

forming the *frame comprising* at least the plurality of information bits, *the outer quality metric, and the at least one inner quality metric.* “ (emphasis added)

Wright discloses a method for organizing a plurality of cells into a fixed size frame comprising the steps of: (a) determining an inner coding rate for a first set of data cells; (b) forming a group of codewords by applying an outer code to the first set of data cells; (c) entering the group of codewords row wise into an interleaving array; and (d) applying an inner code column wise to the group of codewords, thereby forming a fixed size frame body (Wright, Abstract, Col. 1, lines 35-45, Figures 2 and 4). However, Applicants respectfully submit that Wright does not teach, disclose or suggest any of

the above-recited elements of claim 1. First of all, Applicants respectfully point out that an outer code as disclosed and defined in Wright is not an outer quality metric as claimed in the above-recited claim 1. An outer code, as described in Wright, is used to refer to a specific coding scheme such as block code (Wright, Col. 3, lines 23-37). In contrast, a quality metric as described and claimed in the present invention may be a parity bit, a cyclic redundancy check (CRC), or any other quality metric known to one skilled in the art. For example, an outer quality metric may be a CRC determined in accordance with the information bits in a frame. Thus, it can be seen that an outer code as disclosed in Wright is very different and highly distinguishable from an outer quality metric as claimed in the above-recited claim 1.

Similarly, Applicants respectfully submit that an inner code as disclosed in Wright is not an inner quality metric as claimed in claim 1. An inner code, as described in Wright, refers to a particular coding scheme such as convolutional code (Wright, Col. 3, lines 23-26). In contrast, an inner quality metric as described and claimed in the present invention may be a parity bit, a CRC, or any other quality metric known to one skilled in the art. For example, an inner quality metric may be a CRC determined in accordance with a group of information bits that is used to perform integrity check for that group of information bits. Therefore, it is clear that an inner code as disclosed in Wright is very different and highly distinguishable from an inner quality metric as claimed in the above-recited claim 1.

Furthermore, Applicants are unable to find any disclosure or suggestion by Wright regarding a frame that contains an outer quality metric and at least one inner quality metric, as claimed in claim 1. As explained above, an outer code as disclosed in Wright is not an outer quality metric and an inner code is not an inner quality metric as claimed in the present invention. Therefore, the fixed size frame formed by the method disclosed in Wright is clearly not what is claimed in claim 1. Specifically, the fixed size frame as described in Wright does not contain an outer quality metric and/or an inner quality metric, as claimed in claim 1 of the present invention.

Because Wright does not teach or suggest each and every element of claim 1, Applicants respectfully submit that claim 1 is not anticipated or rendered obvious by Wright. Withdrawal of the rejection of claim 1 is therefore respectfully requested.

Since claim 1 depends from claim 1 and includes additional elements/features, claim 2 is also not anticipated or rendered obvious by Wright. Withdrawal of the rejection of claim 2 is respectfully requested.

Claims Rejections under 35 U.S.C. §103

Claims 3, 4, 7, and 8 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,712,861 to Inoue et al. (hereinafter referred to as Inoue) in view of Wright.

Claims 5 and 6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Wright.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicants' disclosure". In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants respectfully submit that claims 3-8 are not rendered obvious by Inoue and/or Wright, either alone or in combinations, for the reasons and explanations set out below.

With respect to claim 3, Applicants respectfully submit that Inoue and Wright do not teach or suggest all the limitations of claim 3. In particular, Inoue and Wright do not teach, disclose, or suggest the following element of claim 3:

"recovering the at least one group of information bits when an inner quality metric corresponding to the at least one group of information bits indicates that the at least one group of information bits in the frame has been received correctly when the frame has not been received correctly"

As discussed and explained above with respect to claim 1, Wright does not teach or suggest any mechanism or method for determining an outer quality metric and an inner quality metric. Specifically, the outer code and inner code described in Wright are clearly not the outer quality metric and the inner quality metric, respectively, as described and claimed in the present invention. Accordingly, there is no description or disclosure in Wright regarding a frame comprising an outer quality metric and an inner quality metric.

Inoue discloses a codeword which contains information symbols representing elements of a Galois field, a parity check symbol generated using a certain element of

the Galois field, and additional check symbols generated using a polynomial over the Galois field (Inoue, Abstract, Col. 10, lines 54-65). Inoue also discloses that the reliability of corrected codewords is assessed by counting the number of symbols found to be in error, or by counting the number of symbols having at least a certain number of bits in error (Inoue, Abstract, Col. 10, line 66 – Col. 11, line 4). However, Applicants are unable to find any disclosure or suggestion by Inoue regarding a frame having an outer quality metric and an inner quality metric, as described and claimed in the present invention. Specifically, there is no disclosure or suggestion in Inoue regarding a method in which, when a frame has not been received correctly, a group of information bits in the frame is recovered when an inner quality metric corresponding to this group of information bits indicates that this group of information bits has been received correctly.

The Examiner asserts on pages 6-7 of the Office Action that the above-recited element of claim 3 is taught by Inoue's disclosure at Column 14, lines 40-55 in conjunction with Figure 4 of Inoue. Applicants respectfully disagree. Again, there is no disclosure or suggestion by Inoue regarding a frame which includes an outer quality metric and at least one inner quality metric that corresponds to a group of information bits in the frame. Figures 2-4 of Inoue and the corresponding description at Columns 13-15 do not show or suggest any mechanism or method for partial recovery of a frame that has not been correctly received. The decoding of C1 codewords and C2 codewords as described by Inoue is very different and highly distinguishable from the method claimed in claim 3 of the present invention because the C1 and C2 decoding process as disclosed in Inoue does not show or suggest any partial recovery of a frame (e.g., recovery of a group of information bits in the frame) based on quality metric information that corresponds to that particular group of information bits in the frame.

Because Inoue and Wright, either alone or in combination, do not teach or suggest all the limitations of claim 3, Applicants respectfully submit that claim 3 is not rendered obvious by Inoue and/or Wright. Withdrawal of the rejection of claim 3 is therefore respectfully requested. Since claim 4 depends from claim 3 and includes additional limitations, claim 4 is also not rendered obvious by Inoue in view of Wright.

With respect to claims 5-6, Applicants respectfully submit that these claims are not rendered obvious over Wright for the reasons and explanations provided above with respect to claim 1.

With respect to claims 7-8, Applicants respectfully submit that these claims are not rendered obvious by Inoue in view of Wright for the reasons and explanations provided above with respect to claim 3.

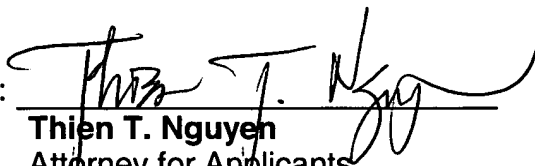
Accordingly, Applicants respectfully request the Examiner to withdraw the rejection of claims 3-8.

REQUEST FOR ALLOWANCE

In view of the foregoing, Applicants respectfully submit that all pending claims in the present application are in a condition for allowance, which is earnestly solicited. Should any issues remain unresolved, the Examiner is encouraged to telephone the undersigned at the number provided below.

Respectfully submitted,

Dated: 01/22/2003

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APPENDIX A

IN THE SPECIFICATION:

The paragraph beginning at line 8 on page 7 and ending at line 18 on page 7 has been amended in this response as follows:

FIG. 3 shows a frame structure **300** with groups of bits of different importance protected by quality metrics in accordance with an embodiment of the invention. The frame structure **300** contains three classes of information bits: class A **306**, class B **304**, and class C **302**. The different classes are of different importance. For the purposes of this discussion, it is assumed that class A **306** information bits are more important than class B **304** and class C **302** bits. All the information bits are protected by an outer CRC **[320] 310**. The more important information bits of class A **306** are further protected by an inner CRC **308**. The frame also contains tail bits **312**. The tail bits **312** do not carry any information, and are all zeros. The tail bits **312** are used to initialize an encoder (not shown) for the next frame.

APPENDIX B

IN THE CLAIMS:

Claims 4, 7, and 8 have been amended in this response as follows:

4. (Amended) The method of claim 3 wherein the recovering the at least one group of information bits when an inner quality metric corresponding to the at least one group of information bits indicates that the at least one group of information bits in the frame has been received correctly comprises:

determining a number of the inner quality metrics;

determining, for each of the number of the inner quality metrics, whether a group of information bits corresponding to the inner quality metric has been received correctly; and

recovering the at [lest] least one group of information bits, which were determined to be received correctly.

7. (Amended) An apparatus for forming a frame of data, comprising:

a processor; and

a storage medium coupled to the processor and containing a set of instructions executable by the processor to:[]

recover the at least one group of information bits when an outer quality metric indicates that the frame has been received correctly; and

recover the at least one group of information bits when an inner quality metric corresponding to the at least one group of information bits indicates that the at least one group of information bits in the frame has been received correctly when the frame has not been received correctly.

8. (Amended) The apparatus of claim [3] 7 wherein the processor recovers the at least one group of information bits when an inner quality metric corresponding to the at least one group of information bits indicates that the at least one group of information bits has been received correctly by executing a set of instructions to:

determine a number of the inner quality metrics;

determine, for each of the number of the inner quality metrics, whether a group of information bits corresponding to the inner quality metric has been received correctly; and

recover the at [lest] least one group of information bits, which were determined to be received correctly.